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ABSTRACT

Workspaces are sites of contention over what is knowledge and who can say so; work-related education has never been a neutral arbiter. In a context in which workspaces routinely bring together physical place and cyber place in communication networks, traditional struggles over knowledge and knowing are affected by communications technologies (CT) in powerful but unobtrusive ways. CT play a part in construction of knowledge, community, and identity between and within workspaces. Formal, informal, and nonformal education mediates CT and helps shape local and global economic activities, working communities, and working lives. Communications networks operate to construct contemporary hybrid workspaces, but are also adopted by local working communities. Knowledge at work in hybrid workspaces has a social and textual character. Technology plays a part in shaping communication and knowledge production in workspaces. Organizations try to join up geographically and temporally dispersed workspaces by introducing software that mimics a physically integrated workspace. Two perspectives for education are the following: (1) educators may adopt the position that trainees, children, or colleagues should be informed of ways in which technology mediated knowledge construction and technologically facilitated collaborative environments can work to their advantage in contrast to the view that the role of education is to provide skills that will make future workers flexible and adaptable to the needs of the organization, and (2) educators can use those aspects of group communication and knowledge construction that benefit learning. (Contains 20 references) (YLB)

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Knowledge is something we do: Knowing and learning in globally networked communities.

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Abstract

This is a paper about knowledge, learning and the idea of community in what we call 'hybrid workspaces'. Hybrid workspaces 'bring together physical place and cyber place' in communication networks (Castells 2001: 131). Many people work in various kinds of hybrid workspaces. A person working on a production line might have realtime co-workers in their own town, just as a colleague might work in a hybrid workspace relying upon others who communicate asynchronously via a website to help them solve problems. Hybrid workspaces, like most workspaces, are centrally concerned with the global production and diffusion of certain kinds of routine and innovative working knowledge. In this paper we think about knowledge as social action that is generated, mediated, negotiated and traded amongst people in the politically charged dynamic of hybrid workspace communities. We consider the ways people adopt, modify and are changed by the technologies they implement in these workspaces. We are especially interested in what people have to learn to know, and to be, to operate effectively in these hybrid communities, and what role formal, informal and non formal education has to play in negotiating what counts as knowledge, and who can say so, in virtual workspaces.

Introduction

> *Lotus Sametime supports immediate communication with people across the hall or around the world – either through secure instant messaging or full collaborative web conferences. Lotus QuickPlace is the easy-to-use, self-service Web tool for team collaboration that end users can create and customize instantly.*

One of the most currently compelling challenges for educators in schools, workplaces and communities is, and will increasingly be, helping people and organizations to co-ordinate and negotiate the working knowledge, working relationships and work practices of geographically, temporally and culturally dispersed workforces and workspaces (Gee, Hull et al. 1996; Farrell 2001; Farrell 2002). Often, this challenge is presented as the simple one, in concept at least, of teaching people to be the kind of 'global worker' that global corporations seem to demand (Hammer 1996). We start from the position that the goal of work related education is neither simple nor necessarily benign. When we talk about work related education we are talking about education that happens in schools, in VET programs certainly but in mainstream curriculum areas too, where students are overtly or covertly encouraged to develop the knowledge and dispositions that are attractive to employers. We are also, obviously, talking about workplace education, education accredited through formal

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training programs, in-house education programs devised and controlled by corporations, and informal education of the 'sitting next to Nellie' kind. We are talking, too, about adult and community-based education, literacy and numeracy programs, for instance, or introductory IT programs, where the aim is to help students become 'job ready'.

We argue that all work spaces are, and always have been, sites of contestation over what counts as knowledge, and who can say so, and work related education has never been, and is certainly not now, a neutral arbiter in this contest. In a context in which workspaces routinely 'bring together physical place and cyber place' in communication networks (Castells 2001: 131) traditional struggles over knowledge and knowing are inflected by communications technologies in powerful but unobtrusive ways. In this paper we want to look more closely at the part that communications technologies play in the construction of knowledge, community and identity between and within workspaces. We want begin to understand how formal, informal and non formal education mediates communication technologies and, in doing so, helps to shape local and global economic activities, working communities and working lives.

We begin by paying attention to the hybrid character of contemporary workspaces, focusing especially on the ways in which communications networks operate to construct hybrid workspaces, but focusing also on the ways in which communications networks are taken up and used in local working communities. We move to a discussion of knowledge at work in hybrid workspaces, focusing first on the social and textual character of knowledge and then on the part that technology plays in shaping communication and knowledge production in workspaces. In this discussion we are particularly interested in what counts as knowledge in these workspaces, who gets to say so, and what part technology plays in mediating the power relationships in local/global networks of production. Finally, we raise some questions about the role that education and educators can and should play in producing working knowledge in hybrid workspaces.

Hybridity and community in contemporary workspaces

Communications networks do not, as Wellman (2001) reminds us, exist exclusively in cyber-place. They are made up of 'things', like optic fiber and satellite dishes and antennas, material objects which must be threaded into the existing city infrastructure while people go about their everyday lives. The most expensive part of establishing a wide bandwidth communications network, up to 80% of the total cost, is the 'last mile', the part where it is woven into established local communities and rubs up against existing roads and bridges and gas pipelines, and old and inaccessible buildings. This is because the material components of the communications network cannot generally be superimposed on a city or a town or a building, they must somehow be accommodated within and around the structures, systems and practices that are already there. Centuries old structures are recruited to new uses; church bell towers, for instance, taking mobile phone antennas so that they call people together with an ancient form of communication and a modern one. When optic fiber is laid the cobblestones are replaced. These processes of hybridization entail friction, struggle, accommodation and adaption. It is not a simple matter to build the hybrid city, that, literally, 'bring[s] together physical place and cyber place' in communications networks (Castells 1996)'.

Local working communities are also in the process of hybridizing, and 'the last mile' here, in terms of human effort at least, is probably also the most expensive. Traditional working communities, communities that relied exclusively on geographical and temporal proximity, and shared practice, are threatened in contemporary workspaces. It is not that that these local working communities are being disbanded. Although this does happen, many established local working communities remain more or less intact. These working communities are now, however, occupying hybridizing work spaces, traditional workspaces in which local communication practice is inflected with the practices required of, or developed within, the global webs of communication made possible and necessary by new communications technologies. Even workers who continue to operate within the one physical workspace, relying heavily on shared physical contexts to make and use routine (often embodied) working knowledge, find their established practices subtly (or more obtrusively) shaped by the communicative practices evolving to create the hybrid workspace in which physical place and cyber place are brought together in a communication network.

When we say that workspaces are hybridizing), then, we mean partly that established communications technologies like pens and paper and landline telephones sit side by side with wide bandwidth connections and mobile phones. We mean also that the uses of these technologies intersect as, for instance, when a person tells someone over the phone that they will email a document to them. More importantly, though, we mean that the communicative practices that are shaped and sustained by the individual technologies come into dialogic relation with each other in the way that Bakhtin means – they struggle with each other, they accommodate each other, they modify each other, and in doing so they produce new communicative practice. While the words are, in Bakhtin's sense 'all half someone else's', the come together in new ways to build new practice, they are never precisely the same as what has gone before. These new communicative practices shape what kind of person we can be in our workspaces, what kind of relationships we can establish and maintain, and with whom, and at what cost, what kinds of communities we can build and what kinds of knowledge we can make. Workspaces are hybrid, then, not just because they are constructed and mediated by a range of communications technologies but also because, when established and new technologies are brought together in these ways their interactions create new discursive resources, discursive resources that make available new working identities, values, practices and sideline others.

While not wishing to labour the point, an example might make the idea more sharply. When, Mary, a mending room supervisor in a regional textile factory, keeps track of bolts of fabric and mending deadlines on a computer data base (in addition to, and not instead of, the exercise book she has used for 30 years) she is communicating simultaneously with colleagues in the weaving shed next door, with managers at Head Office in Melbourne and with suppliers in India and clients in Singapore. Because many people operating in disparate contexts read her data for a range of different purposes there is little room for improvisation or idiosyncrasy, what Mary writes is shaped by the relatively inflexible demands of the data base. For Mary the additional communications medium is an obvious change in communicative practice. What is not so obvious is that the change in Mary's work practice changes everyone else's practice, too. Mary fills in her written log at a worktable facing all the other menders. To enter data on to the computer she must turn her back on them, working at a raised computer desk set to the side of the mending room. This changes the dynamics of

the mending room, removing Mary from the other menders. While the database may be accessed all over the world, by trades people and sales people and managers and clients, it cannot be accessed in the mending room, except by Mary, so Mary's role as supervisor is subtly redefined and the relationships between the menders are recalibrated.

The computer database does not, however, replace the hand written log that Mary and her menders have relied on to regulate their work. The exercise book still exists, and it remains up to date, but its function has changed. While invisible in any formal account of the company's communications systems, the records in the exercise book are back up when the computer system is down, and provide apparently incontrovertible evidence of when a bolt of fabric is ready for shipping when the computer records seem unclear or absent. The exercise book contains information that the formal systems do not concern themselves with. It records which mender dealt with a particular bolt of fabric, how long it took to mend, what kinds of faults are common in what kinds of patterns. The exercise book remains the privileged record, at least for now.

One of the effects of hybridizing work spaces like the one that Mary works in is the challenge it makes to traditional ideas of working communities. While Mary and her mending colleagues seem on the face of it to be an almost prototypical 'community of practice' the boundaries of their community are more attenuated than they used to be. This has implications for the ways in which knowledge is produced and used in the mending room, and implications for what people need to know and to be in order to operate effectively in that environment.

The mending room provides an interesting instance of the ways in which different communications technologies, and the practices associated with them, intersect and resonate through each other in hybrid workspaces. Communications networks are not exclusively composed of optic fiber and satellite dishes, they include paper, pens, whiteboards and telephones, and, of course, speech. They are a complex amalgam of old and new technologies and the local and global practices they generate.

These changes to Mary's working environment are dramatic enough, but if we project her into a computer mediated workspace there are more significant challenges to her working identity, her presence in a hybrid workspace and the to the working communities of which she is a part. Without the ability to physically negotiate with her colleagues in real time, and to be in the same physical spaces while they are working, all of Mary's negotiations with co-workers will require an explicit establishment of her 'Self'. In constructing a 'Presence' in this computer mediated environment Mary must call on new of ways of 'talking herself into being'. This new way of talking will affect the way in which Mary presents herself to all her colleagues, those at the work benches in the mending room as well as those in the supply room in New Delhi. Even those with much more restricted working environments than Mary's will start to use language in new ways, ways that are inflected with the emerging language of the hybrid workspace.

Making and using knowledge in hybridising workspaces

The nature and function of working communities matters in contemporary companies because working communities generate the knowledge that that drives the knowledge

economy. In referring to Knowledge as 'something we do' in the title of this paper (Finlay 1987; Zuboff 1988; Steinberg 1990; Nonaka 1994; Blacker 1995; Casey 1995; Nonaka and Takeuchi 1995; Hammer 1996), we are trying to capture the idea of knowledge as social action. We want to emphasise the importance of people, and their relationships with each other and with the contexts in which they operate, in generating new knowledge and innovation and maintaining and adapting the knowledge we have. In taking this position we are (temporarily) aligning ourselves with a segment of the business literature that takes knowledge production at work seriously and views the maintenance and control of working relationships as the most critical challenge in contemporary economies. More particularly, in our context, we think about knowledge, and skill, as textually mediated social action(Bakhtin 1981; Deetz 1995; Reimer 1995; Engestrom and Middleton 1996; Smith 1999; Farrell 2002; Farrell under review). If knowledge is something we do, we argue that it is increasingly something we do with text. In workplaces, embodied knowledge has traditionally been important, especially in industrial contexts. When Mary runs her fingers across a bolt of fabric, for instance, she is 'feeling' for faults she has guessed will be there well before, when she first saw the pattern and the thread. In this sense, at least some of Mary's knowledge is embodied. In the mending room talk about faults is constant, but generally deeply embedded in a shared context and shared experience. When the knowledge of the mending room is made available to others, however, it is likely to be done through written text.

Text is important in the construction of skill partly because it is largely, although not exclusively, through the textual practice of communities that knowledge is produced and used. Text is also important because certain kinds of textual practice make knowledge visible, and so available for use and reward (Reimer 1995; Roberts 2001).
A major challenge to companies, both local and global, is to build and sustain the kinds of working communities that generate new knowledge in the kinds of hybrisided workspaces that most of us experience (Deetz 1995; Davenport and Prusak 1998; Farrell 2002). While acknowledging the critical importance of embodied knowledge in work practice we are interested here in the ways that even embodied knowledge is textually mediated through communication networks, and produced and transformed in the process.
Scardamalia and Bereiter (1994) provide an example of knowledge construction in which the process and purposes are highly visible. Their work with children identifies an important "knowledge building discourse" centred around groups collaboratively building up community databases. Less evident in this early work is a discussion about the implied and necessary social structure needed to support this kind of collaborative work, but nevertheless the knowledge building model is useful. In a workplace, making contributions to corporate or other institutional databases (or knowledgebases if there is a difference) might be a mandatory condition of employment, or perhaps even an automated function of some technology which monitors "useful" advice and actions. While it is possible that employees recognise an interdependence of worker and database, contributing one's experiences and recommendations to a technological actor mightn't be as attractive as sharing views and experiences around the coffee table. The ways in which people are encouraged and enthused to contribute to dispersed communities which are hybridized in so many ways (technology, temporality, space, virtual space) can be explored. Smith (1999) invites us to think about the regulatory power of texts, the ways in which texts shape relationships, and particularly the way they shape 'ruling relations'. Our focus here is to look at the ways in which relationships in workplaces are shaped and constrained by the textual frameworks emerging in hybridized workspaces.

Looking at Products in the Field

One of the ways in which organizations try to join up geographically and temporally dispersed workspaces is to introduce software which attempts to mimic a physically integrated workspace. The software (like Notes, Quickplace, Groupwise) is designed to co-ordinate the activities of dispersed employees and to provide a common work environment in which employees might meet, solve problems, create new products, identify new markets and, generally, produce new knowledge. Collaboration software is oriented to the social production of knowledge, in so far as it acknowledges that people need to be able to operate together if the organization is to flourish. Collaboration software is not a physical workspace. It is a complex set of rules and parameters that govern what kinds of relationships can take place, who can engage in them, who is visible to whom, who can observe without being visible and who can over-ride routine practices. These rules determine which users can 'invite' other users to a meeting, which users can say no, which users can over-ride appointments, which users can post in to the communications group, and who can delete or edit messages. Collaboration software has a high potential for unobtrusive surveillance, observers can be invisible to members of the group, for instance, or the machine can log the activities of individuals or groups with no indication that it is doing so. While these issues are, of course, part of the on-going negotiations of any workspaces, collaboration software is distinctive because the decisions are so often invisible. In a physical workspace, if you are not invited to a meeting, for instance, you may pass the room in which it is being held and ask about it. You may see papers regarding it on a colleague's desk. You may overhear conversations about it. This is difficult to do in a working environment defined by collaboration software.

Hybrid workspaces using collaborative software challenge conventional notions about communities of practice at work. While they are designed, at least in part, to exploit the knowledge producing power of spontaneously generating communities of practice in local workspaces, they are anything but spontaneous. The imagined communities of collaborative software are highly regulated and controlled, and potentially subject to unobtrusive surveillance on a scale not generally experienced in local workspaces.

The communities of workers interwoven with their software are subject to systems and the structures. These rules and resources used to support them are introduced into work environments in various ways, possibly accounting for problems relating to existing systems and for meeting the particular needs of the individuals and social organizations. One example is in the ways that these hybrid communities are initiated. When people adopt any system, their appropriations can be either "faithful" or "ironic" (Poole and DeSanctis, 1990:184) . This means that the adoption of the system may or may not be supportive of the spirit of structure, and may or may not support the operations of the structures. In the same way, the attitudes of users to such a system may change over time, or may remain fixed. Rogers (1995) pays particular attention to aspects of initial uncertainty and the characteristics of *change agents and early adopters* in the diffusion of innovations. Now we can consider the complexity of systems within and surrounding older systems each carrying their individual (and interdependent) perceived purposes, responses and values.

Lotus describes their product as the standard for Instant Messaging and Presence. We are

interested in the ways that instant (synchronous) communication is valued as a necessary feature of effective business practice, particularly when the technology / knowledge advantage would appear to have stronger affiliations with asynchronous methods (Hesse, Werner and Altman 1987). The ways in which workers learn and select appropriate temporal media will affect their voice, 'knowledge outcomes', and the ways in which others are expected or forced to respond. We can consider the ways in which a co worker might request immediate information from a colleague via an instant messaging system as efficient and also rewarding for the parties who find themselves able to respond usefully to joint ventures. By the same token, considered responses from asynchronous methods, particularly "knowledge bases" are selected as the appropriate source in certain circumstances, possibly without providing feedback or reinforcement to the providers or contributors of that information. This has implications for the whole question of the ownership of knowledge.

What does Lotus mean by "presence"? We are reminded of the video walls used by international organisations so that people can observe or feel connected with co-workers in other places. *Presence* must also describe the connectedness and perhaps feelings of exposure or even vulnerability while being available to others through synchronous texts (chat rooms, instant messaging systems, rapid response email). This presence clearly can also offer efficiencies, sense of belonging and a host of monitoring and supervision activities.

The role of education

There are two perspectives for education. In the first place, educators can adopt the position that their work with trainees, children, or colleagues ought to inform them of the ways in which technology mediated knowledge construction and the technologically facilitated collaborative environments can work to their own advantage. This is in contrast to a view that education has a role in providing skills for future workers that will make them flexible and adaptable to the needs of organizations. In our view the latter skills are easily and more appropriately gained from a perspective of the learner and their understandings of the applications and implications of technologies. The second position is one of employing those aspects of group communication and knowledge construction that can benefit learning. Clearly this can be achieved from a critical perspective, even for young students. Learners can begin a process of understanding and developing the resilient (possibly multiple) identities that they will need in a safe environment where various imperatives can be made transparent. At the same time, they can begin the endless process of learning to understand and control the multiple ways that they are represented. These notions of *self* and of *presence* are peculiar to hybrid workspaces and become fundamental as the pervasiveness and impact of new technologies grow too difficult to understand. It can be expected that problematising power relations in hybrid workspaces would become as much a part of the learning process as the other capabilities that learners develop in their understanding of their own learning methods.

As educators we need to consider what people need to know (at school, in work-related education, on reentry to the workforce, as we change jobs etc), not so much about specific technologies (they will keep changing) but more about technological practices, the ways in which generations of technological practices interact to produce new textual practices, and the impact they have on the social production of knowledge, skill and identity.

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